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ABSTRACT

At the Edna A. Hill Preschool Laboratories at the University of Kansas, children between the ages of two and five are being taught two kinds of precise skills, some to prepare them for the academic world and others to enable them to care for themselves more independently. Behavior analysis and application of reinforcement principles make earlier skill development possible. In this program, skills are programmed by simplifying the steps, isolating the specific responses, and consistently reinforcing correct responses. The amount of time and effort exerted by both child and adult is greatly decreased. An example of a self-help skill taught in this program is shoe-tying. As the child learns the skill, he is reinforced, the extra-long laces are shortened, and the instructions are phased out until he can tie his own shoes with no instructions. Through such programming, skills have been successfully and easily taught to children in the program at earlier ages than would traditionally be expected. (MH)

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A SHOE IS TO TIE[1]

A FILM DEMONSTRATION OF PROGRAMMING SELF-HELP SKILLS FOR PRESCHOOL CHILDREN

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At the Edna A. Hill Preschool Laboratories at the University of Kansas, children between two and five years of age are learning precise skills, some important to their independence in caring for themselves, and some to enable them to tackle the academic world with ample resources.

An example of the techniques used to develop procedures for teaching preschool children both self-help and preacademic skills is a shoe tying program. The program demonstrates that the application of operant conditioning principles, specifically the principles of reinforcement and stimulus control, can make a skill, traditionally considered complex, quite simple and easy to learn for very young children.

Why be concerned with programming a skill that the child will certainly learn sometime later? Think how frequently a child's activities are interrupted because his shoes are untied. How frequently does a teacher have to stop what she is doing to tie a child's shoe--untied shoes sometimes lead to accidents. Wouldn't it be better if the teacher were free to applaud climbing skills rather than bemoan untied shoes? And sometimes the teacher isn't around to catch those dangling laces.

The usual teaching procedures can be tiring and boring times for the child. Tying laces is complex. It requires a great deal of fine motor coordination. Combining small hands, short laces, and imprecise instructions, the process can be exhausting for the child, and frustrating for the adult. The more the adult tries to help, all too often, the more that extra pair of large hands just adds to the confusion.

By simplifying the steps, isolating the specific responses, and consistently reinforcing correct responses, shoe tying becomes simple. Through such programming, errors are minimized. The amount of time and effort exerted by both the child and the adult is decreased.

And for a four year old to tie his own shoes with no help from his parents or his teacher is another item on his important list of "things I can do myself."

Let's see how Mike learned to tie his shoes.

This is the child's view of the shoe used during the program sessions. Notice that half the lace is red, half is white, and each half has special markings. The shoe is permanently attached to the board.

Mike is trying to tie his shoe during the pretest. Actually, he said, "I can't tie my shoe," but since we seldom accept verbal behavior alone, Miss Cooper asked him to try. He attempted but finally gave up.

Miss Cooper's first instructions are: "This is the white lace. Pick up the white lace." The same procedure is administered for the red lace. Chips are being placed in Mike's cup for each correct response. He knows that he can trade those chips, later, for special activities.

In this step of the program, the instructions are, "Make the white lace fly." The end of the lace is placed on the blue mark in the upper corner of the board to keep the laces from becoming tangled. The step for the red lace is the same. The child is to make both laces fly.

"Here is the white tunnel."

"You make a white tunnel like this."

"This red road goes under the tunnel like this."

"You make the red road go under the tunnel."

She points to where the red lace should stop.

"Now pull both laces to make a knot."

After each step of the program, the child returns to the beginning of the sequence with instructions shortened and ultimately eliminated. Many of the children often imitate Miss Cooper's behavior, even though they are not instructed to do so. Notice that Mike also points to where the red lace should stop.

At the end of each session, the chips which the child has earned are traded for red tokens--in this case two. The red tokens are later traded for back-up reinforcers, like going for a walk, or digging for marbles in the sand.

To help the child make the bow, two blue marks are placed on each of the laces.

The instructions for making the bow are:

"Put the two marks together to make a white rabbit ear."--And then--"You make a white ear."

"The red lace is an ear like this."--followed by--"Put the two marks together to make a red ear."--And then--".....two rabbit ears!"

The red ear is then placed across a yellow mark on the white ear and the child is instructed to hold both loops in one hand.

"See the big hold?"

"Point to the big hold."

"Put the red lace under and up through the hold."

Each of the steps is performed by the child and he then carries them out in sequence.

"Now pull the red ear and the white ear."--And then--"You tied the shoe!" .....and you get a token." A mark is placed on the data sheet indicating correctness.

By the fourth session, Mike is quite adept at tying the shoe on the board. The remainder of the program is designed to decrease the supportive cues, until the child is tying a shoe which is more similar to his own shoe. The laces will become shorter; both of them will become white; and the marks on the board and the laces will be eliminated.

Mike is showing a shoe with 24" white laces. The original laces were 34". The laces were decreased in length from 34, to 27, to 24, and will be reduced once more to 21 inches. The 24" lace that Mike is now tying is all white but the marks are still there to indicate where to make the loops for the bow.

Now the laces have been decreased to 21" and there are no marks on them. The 27" lace, which was not shown, was like the original shoelace except for the length of the laces.

Although our laces were not as fancy as his, Mike still was able to tie his own shoe in the posttest.

.....and obviously for Mike, the camera was also a big reinforcer for learning to tie his shoe.

Figure 1 summarizes the history of this shoe tying program over the several months the program was being developed. The subjects, lettered A to S in order of the program development are represented on the horizontal

axis. The age of each subject in years and months is noted below his letter. The flower above each child's bar indicates his percent of total correct responses as he progressed through the program. With only one exception, all children had 90 percent or more correct responses.

Each child's bar represents the total number of responses emitted before each child tied his own shoe. The decreasing heights indicate a decrease in the number of responses required during the program as it was developed, revised, and items were eliminated. The variation in the number of total responses indicates: elimination of unnecessary responses, and addition of responses to eliminate individual errors. For example, as the program was developed unnecessary responses were eliminated and child 1 required less then half as many responses as child A. Child L, on the other hand, required a revision in the fading program. Tape to mark the "ears" was put on his own laces, increasing his total responses emitted. Since the program is fitted to the child--not the child to the program--there will always be variations in procedures among children.

Comparing heights of the bars and the line of flowers shows that many unnecessary items were dropped, but the success of the program was maintained, shown by the 90 percent or better correct responding. Age alone, within the range represented here, apparently has little to do with learning the shoe tying skill.

This film has been an example of applying learning principles systematically to a specific child behavior. Tradition suggests that we do expect children to learn certain behaviors before a specific age. When an analysis of behaviors critical to a skill is made and these behaviors are then taught precisely, the skill is acquired earlier and with less frustration than usually expected. Early acquisition of basic skills enables the child to come in contact with an increased world of stimuli and thus leads to learning more skills. And successfully acquiring this skill, through its efficient procedures, increases the likelihood that the child is motivated to further learning.

FOOTNOTES

[1]This film is a demonstration of programming self-help skills for preschool children and was created and developed by Margaret L. Cooper, was filmed and directed by Judith M. LeBlanc, with Dr. Barbara C. Etzel as consultant, William M. Meikle as narrator and the stills were produced by David G. Flemming.

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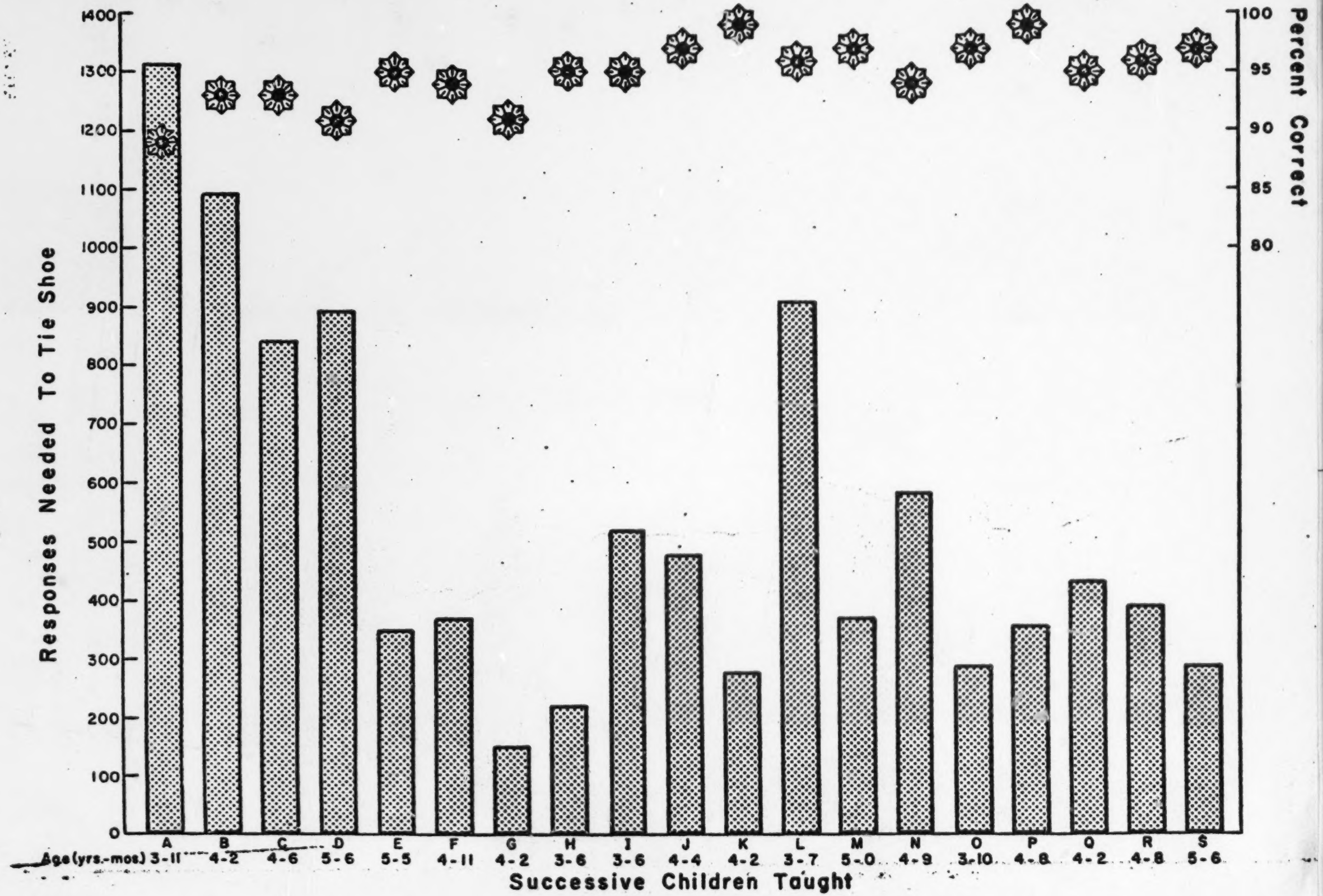
Responses Needed To Tie Shoe
Percent Correct
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
100
95
90
85
80
A B C D E F G H I J K L M N O P Q R S
Age (yrs.-mos.) 3-11 4-2 4-6 5-6 5-5 4-11 4-2 3-6 3-6 4-4 4-2 3-7 5-0 4-9 3-10 4-8 4-2 4-8 5-6
Successive Children Taught